REMARKS

Applicants respectfully request consideration and allowance of claims 97-112, and 129-144 that are pending in the above-identified patent application. Applicants have amended claims 97, 100, 101, 129, 130, 133, 135, 136, and added new claims 137-144. No new matter has been added by the claim amendments.

Examiner Interview

The undersigned thanks the Examiner for the courtesies that he extended to me, one of the inventors, Dr. Gadkaree, and Counsel for Corning Incorporated, Mr. Schaeberle, during the interview on September 25, 2006. The details of the interview will be discussed below.

Rejections from July 25, 2006 Office Action

During the interview, the Applicants' decision to pursue different inventive features in the claims was discussed. The amendments herein have removed the resistivity and CTE limitations from the independent claims. (Applicants are considering pursuing independent claims directed to the resistivity and CTE features in a continuation application.) Given the amendments herein, the rejections pending in the July 25, 2006 Office Action are moot.

Ion Concentration Features

During the interview, certain features regarding ion concentration levels in the substrate layers of the semiconductor-on-insulator structure were discussed. The Examiner appeared to be persuaded during the interview that such features, when added to the claims (as they have been), would render the instant application allowable. The ion concentration features are discussed in detail below.

The basic structure of the respective semiconductor-on-insulators recited in independent claims 97, 135, and 139 include:

> a first layer of substantially single-crystal semiconductor material;

a second layer of substantially single-crystal semiconductor material with an enhanced oxygen content located on the first layer; and

a substrate layer of an oxide glass or an oxide glass-ceramic.

The substrate has: (i) a first substrate layer adjacent the second layer of substantially single-crystal semiconductor material, the first substrate layer having a reduced positive ion concentration in which substantially no modifier positive ions are present, (ii) a second substrate layer adjacent the first substrate layer and having an enhanced positive ion concentration of modifier positive ions, including at least one alkaline earth modifier ion, and (iii) a third substrate layer adjacent the second substrate layer. None of the cited art of record discloses or suggests the above combination.

The above features are described and illustrated throughout the instant application. By way of example, the ToF-SIMS Depth Profile illustrated in FIG. 10A was discussed at the interview. That figure shows (just to the right and adjacent the silicon layer) a layer of silica, and then a substrate layer of reduced positive ion concentration. Notably, no substantial concentration of the modifier positive ions that normally might be present in the substrate material (such as, Mg^{+2}, Ca^{+2}, Sr^{+2}, and/or Ba^{+2}) is present in the substrate layer of reduced positive ion concentration. The next substrate layer, however, exhibits enhanced positive ion concentrations for alkaline earth modifier ions.

In contrast to the above features, the prior art does not disclose or suggest the claimed reduced and enhanced ion concentrations. For example, the Stewart reference (U.S. 6,610, 582) discloses the migration of sodium ions away from the silicon/glass interface. An example of this type of migration was discussed during the interview with reference to the attached SIMS chart. As can be seen in the chart, no layer of enhanced modifier (including alkaline earth modifier(s)) is produced using the process disclosed in the Stewart reference. The significance of this deficiency in the prior art is discussed below.

While the present invention is not limited by any theory of operation, the combinations of the first substrate layer of reduced positive ion concentration (having substantially no modifier positive ions) and the second substrate layer (having one or more alkaline earth modifier ions) exhibits a significantly advantageous characteristic: it inhibits a migration of positive ions from

the substrate layer(s) into the semiconductor material during later processing, such as thin film transistor deposition on the semiconductor layer. Indeed, among the advantages of the claimed invention is the ability to elevate the temperature of the semiconductor-on-insulator structure during processing (e.g., transistor deposition) while minimizing positive ion migration from the insulator substrate into the semiconductor layer.

Conclusion

Applicants respectfully request early and favorable action in view of the above remarks and amendments. It is not believed that any fees are due. In the event there are any fees due and owing in connection with this matter, please charge same to our Deposit Account No. 11-0223.

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Respectfully submitted,

By: _____

Timothy Schaeberle
Registration No.: 34,424
Corning Incorporated
Patent Department
SP-TI-03-01, Corning, NY 14831
Telephone (607) 974-3164
Attorney for Applicant